Einladung zum Gastvortrag
im Rahmen des Seminars Chemie und Technologie der Materialien von

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Technische Universität Wien

„Monolithically Integrated Mid-infrared Nanosensors”

This talk aims to give a short introduction in the field of quantum cascade devices with a strong focus on quantum cascade lasers (QCLs) and quantum cascade detectors (QCDs). A bi-functional QC structure will be presented [1,2], that can be operated in two modes, as coherent light emitter as well as intersubband detector, depending on the bias applied to the structure [3]. This opens the way to on-chip sensing solutions with a high integration density [4]. Liquid sensing at room temperature with a monolithic integrated sensor was achieved by a QCL, a dielectric loaded Surface Plasmon Polariton (SPP) waveguide as interaction section of the infrared light with the liquid, and a QCD. To demonstrate gas sensing with the same technology a surface emitting and detecting sensor was processed using the very same heterostructure material. A distributed feedback ring quantum cascade laser is integrated on-chip with a detector element. The surface emitted light is collimated, guided through a gas cell, back reflected by a flat mirror, focused, and detected by the sensor element on the very same device. The surface operation mode enables for comparable long interaction lengths as needed for gas absorption measurements [5].


Freitag, 24. Juni 2016, 14:00 Uhr
Seminarraum 2 der Fakultät für Chemie
Währinger Straße 42, 1090 Wien

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